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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/030,312	01/10/2002	Nobuyuki Okuda	50395-109	2216
20277	7590	05/19/2004	EXAMINER	
MCDERMOTT WILL & EMERY 600 13TH STREET, N.W. WASHINGTON, DC 20005-3096			MERCADO, JULIAN A	
			ART UNIT	PAPER NUMBER
			1745	

DATE MAILED: 05/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/030,312	OKUDA ET AL.	
	Examiner	Art Unit	
	Julian Mercado	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1-10-02</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Objections

Claim 4 is objected to because of the following informalities:

- a. In claim 4 at line 4, it is suggested to change "8GPa" to --8 GPa--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "hard" in claim 1 is a relative term which renders the claim indefinite. The term "hard" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claims 2 at line 6, claim 4 at line 3, claim 5 at line 3, claim 6 at line 3, claim 7 at line 4, and claim 8 at line 2 recite the term "hard" and are rejected under the same grounds as independent claim 1.

Claims 3 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being dependent upon a rejected base claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Japanese Patent 10-308226 (hereinafter JP '226).

Claim 1 is rejected under 35 U.S.C. 102(a) as being anticipated by Japanese Patent 2000-67881 (hereinafter JP '881).

The rejections based on either JP '226 or JP '881 will be discussed in parallel.

The examiner notes applicant's discussion of the JP '226 or JP '881 references on pages 8-9 of the specification which are allegedly patentably distinct from the claimed invention insofar as the carbon film or amorphous carbon taught by the references, respectively, have "low" film hardness. However, to the extent that the term "hard" may be subjectively interpreted by the examiner for the reasons discussed under 35 U.S.C. 112, second paragraph (discussion above), any distinction between "hard carbon" and "soft carbon" are considered arbitrary. For example, the carbon films in the JP '226 and JP '881 references are considered to

teach a hard carbon film in that the films remain in free-standing contact with the gas diffusion electrodes on which they are applied, albeit while being subject to damage by vibration.

Regarding dependent claim 9, the examiner notes that the particulars of the fuel cell as recited in independent claim 1 is not requisitely part of the fuel cell in dependent claim 9, since dependent claim 9 only incorporates the “separator” of independent claim 1 and not the “fuel cell” as recited in independent claim 1 *per se*. In this respect, JP ‘226 recites a solid electrolyte type fuel cell. (Abstract)

Claims 1, 7 and 9 are rejected under 35 U.S.C. 102(a) as being anticipated by Nishida et al. (WO00/01025).

For purposes of detailed discussion the examiner relies on the equivalent U.S. Pat. 6,660,419 B1.

The examiner notes that while the limitations in independent claim 1 drawn to “multiple single cells” being “laminated and made up of solid polymer electrolyte layer and catalyst electrode layers” are believed to be taught by Nishida et al., these limitations will not be addressed in this detailed discussion as independent claim 1 recites a “separator” in the preamble of the claim and not a “fuel cell” *per se*. Thus, only the claimed particulars of the separator will be addressed in this detailed discussion as it pertains to independent claim 1.

Nishida et al. teaches a separator covered with an electrically conducting carbon film by way of a separator plate filled with carbon powder “has a surface covered with the carbon powder layer”. (col. 5 line 1-9) The carbon layer is specifically disclosed as electrically conducting as found in col. 16 line 46-54:

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In a cell in which the glassy carbon powder is coated on the stainless steel separator plate, glassy carbon particles 8, which are fixed to an organic binder 7, pierce an oxide coat layer 3 and reach a metal base 2 while making contact with the carbon fibers 1 of the gas diffusion layer of the electrode, at the contact surface with the electrode, as schematically shown in FIG. 10. Since the conductive paths are formed by this glassy carbon particles 8, the contact resistance is significantly improved.

As to dependent claim 6, at least one element constituting the separator substrate is considered included in the conducting carbon film to the extent that the "spongy metal" of the separator plate is co-extensive with the carbon powder layer. (col. 5 line 1-9)

Regarding dependent claim 9, the separator in Nishida et al. is indeed employed in a solid polymer electrolyte type fuel cell. (Abstract)

Claims 1-3 and 9 are rejected under 35 U.S.C. 102(e) as being anticipated by Yoshimura et al. (U.S. Pat. 6,291,094 B1)

As above, with respect to independent claim 1 the limitations drawn to the fuel cell are omitted from this detailed discussion. Yoshimura et al. teaches a separator covered with an electrically conducting carbon film in contact with the gas diffusion electrode, "[t]he separator has a carbon material coating on a contact face that contacts an adjacent member (for example, a gas diffusion electrode) when the separator is incorporated into a fuel cell". (col. 2 line 20-23)

An intermediate layer such as titanium nitride is interposed between the separator substrate and the conducting carbon film. The claimed separator structure is shown in Figure 4 as follows: substrate [65], intermediate layer [62], carbon film [64]. Regarding dependent claim 9, the separator is employed in a solid polymer electrolyte type fuel cell. (col. 3 line 43-49)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4, 5 and 8 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over either JP '226 or JP '881.

Claims 4, 5 and 8 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Nishida et al.

Claims 4, 5 and 8 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yoshimura et al.

Regarding dependent claims 4 and 5, as to the hardness and resistivity of the electrically conducting film, the electrically conducting film in the prior art is asserted to naturally flow to inherently have the same measurable hardness as claimed, absent of a showing by applicant that the claimed invention distinguishes over the reference. *In re Best*, 195 USPQ at 433, footnote 4 (CCPA 1977) and *In re Spada*, 15 USPQ 2d 1655 (Fed. Cir. 1990)

As to the claimed sputtering, cathode arc ion plating, plasma CVD or ionized vapor deposition as the method used to form the conducting carbon film, these process limitations have not given patentable weight as such limitations do not give breadth or scope to the product claim. The claimed carbon film appears to be the same or similar to the prior art product insofar as

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being an electrically conducting layer of a fuel cell separator. In the event that any differences can be shown by the product of the product-by-process claim 8, such differences would have been obvious to the skilled artisan as a routine modification of the product absent of a showing of unexpected results. *In re Thorpe*, 227 USPQ 964 (Fed. Cir. 1985).

Claim 6 is rejected under 35 U.S.C. 103(a) as obvious over either Nishida et al. or Yoshimura et al. in view of Fukui et al. (WO99/19927)

The teachings of Nishida et al. and Yoshimura et al. are discussed above.

As to dependent claim 6, while neither Nishida et al. or Yoshimura et al. explicitly teach a hydrogen content of less than 1 atom %, absent of unexpected results it is asserted that this is an optimizable parameter for a result-effective variable. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) The skilled artisan would find obvious to optimize the purity of a carbon film for a fuel cell separator for reasons such as prevention of oxide formation and lowering of contact resistance. (see Fukui et al., col. 48-58 in the equivalent U.S. Pat. 6,440,598 B1)

Conclusion

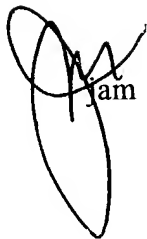
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian Mercado whose telephone number is (571) 272-1289. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



am



Patrick Ryan
Supervisory Patent Examiner
Technology Center 1700